CHAPTER 6

NUCLEAR, BIOLOGICAL, AND CHEMICAL OPERATIONS

6-1. **The following tasks are referenced in STP 21-1-SMCT, dated October 1990:**

031-503-1004	Put on, wear, remove, and store your M17-series protective mask with hood.
031-503-1005	Maintain your M17-series protective mask with hood.
031-503-1007	Decontaminate your skin and personal equipment.
031-503-1015	Put on and wear MOPP gear.
031-503-1019	Recognize and react to chemical or biological hazard.
031-503-1018	React to nuclear hazard.
031-503-1014	Use M8 detector paper to identify chemical agent.
031-503-1020	Use M9 detector paper to detect chemical agent.
031-503-1023	Exchange MOPP gear.
031-503-1030	Prepare the chemical agent monitor for operator.
031-503-1031	Put the chemical agent monitor into operation.
031-503-1006	Drink from canteen while wearing your protective mask.
031-503-1008	Use the latrine while wearing MOPP 4.

NOTE

For those units with M40-Series protective mask, refer to the following tasks which are referenced in STP 21-1-SMCT, dated October 1992.

031-503-1024	Replace canister on your M40-Series protective mask.

031-503-1025 Put on, wear, remove, and store your M40-Series protective mask.

6-2. **Decontaminating apparatus portable: DS2 1 1/2 Quart ABC-M11 NSN 4230-00-720-1618**.

a. A fire extinguisher-like device used to spray DS2. It is refillable and is charged by nitrogen cylinders. The apparatus comes with a mounting bracket that may be attached to vehicles and equipment.

(1) USE. To spray DS2 on those surfaces of vehicles and equipment most likely to be touched by operators and crew.

(2) LIMITATIONS. At low temperatures, two nitrogen cylinders may be needed to charge the apparatus.

REFERENCES: FM 3-5, Appendix E
TM 3-4230-204-12 & P

6-3. **The following tasks are referenced in STP 21-24, SMCT, dated October 1992**.

a. 031-503-2001 Use M256 or M256A1 Chemical Agent Detector kit.

b. 031-503-2013 Use and Perform Operator Maintenance on the M17-Series Radiacmeter.

(1) Use M256 or M256A1 Chemical Agent Detector Kit 031-503-2001.

(a) CONDITIONS

Given a chemically contaminated area, an M256 or H256A1 chemical agent detector kit, and a watch. You are in MOPP 4.

(b) STANDARDS

1 Perform operator checks on M256 or M256A1.

2 Operate the M256 or M256A1 in sequence.

3 Identify agent found.

4 Report results to supervisor.

(c) TRAINING AND EVALUATION

Training Information Outline

NOTE
Use the M256 TRAINS kit for all training and evaluation purposes. Notify supervisor if discard date is within six months, so a new kit can be ordered. Dispose of damaged sampler-detectors IAW TM 3-6665-307-10.

1 Before operator preventive maintenance checks and services (PMCS):

a Check waist and shoulder straps to ensure they are not broken.

b Check that M8 paper is present.

c Check each sampler-detector protective bag for discard date.

d Ensure at least four sampler-detectors are in the kit.

2 Preparation for use.

a Put the shoulder strap over your head and one shoulder. Adjust the shoulder strap so that kit hangs at your waist.

b Hook the waist belt attachment strap to your belt.

c Open the kit by pulling the strap away from the fastener strip. Grasp case top and pull up while turning top away from your body.

d Take out the instruction cards and read both sides of the three or four cards.

e Take out one sampler-detector and read both sides of the protective bag.

WARNING

To avoid test results you cannot trust, open sampler-detector bag and conduct tests while facing into the wind. This will prevent vapors from your equipment and clothing from contaminating the sampler-detector.

NOTE

Do not let sampler-detector be exposed to heavy rain or other forms of water. You may not be able to trust the test results. Do not touch sampler-detector test spots. Dirt and oil from your gloves will cause results you cannot trust.

f Open the sampler-detector by tearing the protective bag along tear line marked by arrows. Carefully pull out sampler-detector and save bag for reference to instructions.

g Examine sampler-detector for broken or missing ampules, missing spots, or crushed reagent channels.

h Check blood agent test spot (pinkish, discard).

3 Testing for toxic agent vapors.

WARNING

Before breaking glass ampules (except heater ampules), place one heater pad on each side of the sampler-detector, covering the ampule to be broken. These pads will prevent pieces of glass from cutting your gloves or hands.

a Swing out the heater; remove and save the two heater pads for breaking glass ampules. Keep protective strips over spots. Swing heater back in.

b Remove pull tab (marked 1) to expose Lewisite detecting tablet.

c Bend tab (marked 2) over Lewisite detecting tablet and rub upper half of tab until a mark is visible.

d Hold sampler-detector with test spots and arrow pointing up.

e Using the heater pads, crush four ampules in the three center pockets (marked 3).

NOTE

Nerve spot may be difficult to wet with solutions as kit gets older. Work solutions into spot carefully, while pressing protective strip over nerve agent spot.

f Turn sampler-detector with test spots and arrow pointing down. Using heater pads, squeeze ampules to force liquid through formed channels.

g Hold the sampler-detector with test spots and arrow pointing down and your thumb on the protective strip over the middle test spot.

h Swing the heater away from the test spot.

i Activate first heater ampule (marked 4) by crushing one green ampule, and swing heater immediately over test spot. Hold sampler-detector to one side, while venting to avoid vapor. Do not use heater pads to crush this ampule.

j After about two minutes, swing heater away from test spot, and protective strip away from test spots.

WARNING

Do not hold sampler-detector in direct sunlight while exposing test spots. You may not be able to trust the test results.

k Expose the test spots for ten minutes. The sampler-detector can be laid down or held by hinged protective strip.

l After about ten minutes have elapsed, crush the second green ampule (marked 4) and swing heater immediately over test spot.

m After about one minute, swing heater away from test spot.

n Hold sampler-detector with test spots and arrow pointing down.

o Using heater pads, crush remaining ampules (marked 5). Be sure to wet test spots by squeezing ampules to force liquid onto test spots.

p Re-rub Lewisite detecting tablet. Bend tab over Lewisite detecting tablet and rub bottom half of tab until a mark is visible.

q Turn the sampler-detector upside down and compare colors of test spots with those shown on sampler-detector. Look for a change in color of rub marks on Lewisite detecting tab. If your kit has a fourth instruction card, use it **to** compare colors to determine safe or dangerous condition.

r Report the test results to your supervisor.

NOTE

You can compare blood agent (round spot) and Lewisite (rubbing tab) tests after about ten minutes exposure time. Blister agents (H and CX) develop color immediately after all ampules are broken. Nerve agent requires a waiting period of about three minutes. If no color develops for the M256A1, a positive nerve test is indicated.

Disregard any small blue or blue-green areas under plastic rim of nerve agent spot.

Look very closely at rub marks on Lewisite tablet rubbing tab. At low concentrations, change may be very slight. Compare with second rub mark before making judgement.

NOTE
Yellow and orange sometimes occur on blood agent spot when no agent is present. Pink or blue must be present to indicate blood agents. Any combination of colors, or rainbow effect, which includes pink or blue should be considered as a positive blood agent test.

4 After operation PMCS.

a Check that M8 paper is present.

b Make sure there are at least four sampler-detectors in the kit.

(2) USE AND PERFORM OPERATOR MAINTENANCE ON THE IM174-SERIES RADIACMETER Task# 031-503-2013

(a) CONDITIONS

Given an IM174-series radiacmeter; TM 11-6665-213-12 or TM 11-6665-232-12; appropriate batteries; clean, lint-free cloth; a soft brush; fine sandpaper or No. 000 steel wool; a flat-tip screwdriver (or similar object); denatured alcohol; pencil; and paper.

(b) STANDARDS

Perform preventive maintenance checks and services (PMCS) on IM174-series radiacmeter and prepare the radiacmeter for use. Read instrument within plus or minus 10 percent.

(c) TRAINING AND EVALUATION

Training Information Outline

1 The IM174-series radiacmeter is a radiation detection instrument that measures gamma radiation. It has a dose rate range of 1 to 500 centigray (cGy) per hour.

2 The IM174A/PD radiacmeter can have a radioactive meter dial or a nonradioactive meter dial or a nonradioactive meter dial with a meter light. The IM174A/PD can be single-battery or multi-battery type.

3 The IMl74B/PD comes only as a single-battery type and has a built-in meter light.

4 Operator PMCS is required before and after operation.

a Before operation PMCS includes the following actions:

[1] Ensure the DA Label 80 is affixed to the instrument and indicates the instrument is within the calibration/certification requirements.

[2] Clean exterior metal surfaces with denatured alcohol, cleaning cloth, and brush. Remove rust and corrosion from battery contacts with sandpaper or steel wool.

[3] Inspect for cracked or broken meter glass. Clean, using soft cloth.

[4] Check controls for smooth operation (no sticking or binding).

WARNING

Provide adequate ventilation when using denatured alcohol. Do not use near heat or open flame.

[5] Inspect meter lamp battery and clip ring (if present) for corrosion or damage. Clean meter lamp if necessary.

[6] Inspect battery compartment and contacts for corrosion and damage. Sand off rust and corrosion. Wipe clean with alcohol dampened cloth.

[7] Check batteries for signs of leakage or corrosion. Dispose of leaking batteries through supply channels.

[8] Check for sticking or bent pointer once batteries are installed.

b After operation, PMCS consists of removing the battery or batteries.

[1] Remove battery cover by loosening captive screw(s) and lifting cover with flat-tip screwdriver.

[2] Remove battery or batteries and replace cover.

NOTE
Uncorrected deficiencies or shortcomings must be recorded on DA Form 2404 IAW DA Pam 738-750. However, this is not a performance measure of this task.

5 Batteries should be installed when preparing the radiacmeter for use. Meter lamp battery is installed following the same procedures.

a Loosen captive screw(s) and remove battery cover.

b Install batteries following the polarity marks on the battery compartment.

c Remove the meter lamp cover (not waterproof) by lifting the tab on the bottom. The cover snaps back into place.

6 The radiacmeter should be prepared for use.

a Unfasten snaps on carrying case, pull back, and snap to rear fastener.

b Turn OFF/SET knob clockwise to SET. Allow at least two minutes for warm-up. Twenty minutes should be allowed for complete warm-up.

c Zero the instrument.

[1] Hold ZERO/CHECK switch at zero.

[2] Adjust OFF/SET knob until needle is aligned on zero.

[3] Release ZERO/CHECK switch. Needle should move to between five and ten centigray (cGy) per hour and return to zero.

NOTE
This instrument can be zeroed in a contaminated area.

d Perform battery check.

[1] Hold ZERO/CHECK switch at CHECK.

[2] Needle should move to and stay in CHECK band. Reading must be within band or no more than three needle widths above. If low, replace batteries.

[3] Release switch.